REMARKS

Applicants' representatives thank the Examiner for the courtesy of a telephone interview conducted on November 15, 2004. While agreement was not reached on all issues, it is believed that the present response addresses the substantive points discussed during the interview. Accordingly, the present response is believed to constitute a complete written statement of the reasons presented in the interview as warranting favorable action, as required by 37 C.F.R. §1.133.

The present response includes the claims as submitted in the Supplemental Amendment filed September 8, 2004, which was before the date the Patent Office issued the Final Office Action (September 15, 2004). Accordingly, it is believed that the finality of the rejection should be withdrawn, as the Patent Office has not yet had time to consider the Supplemental Amendment.

The changes filed in the Supplemental Amendment of September 8, 2004 are as follows.

New claims 334-377 have been added. These claims are supported by the specification, for example, on page 43, lines 12-16, or on page 62, lines 29 to page 66, line 19. Accordingly, no new matter has been added.

Previously cancelled claims 203-260 and 263-327 (as renumbered by the Patent Office in the Office Action of September 2, 2003) have been re-presented as new claims 378-500. Several minor typographical errors in these claims have also been corrected, including correcting subscripts and adding or removing periods as necessary. Accordingly, no new matter has been added.

Additionally, independent claims 1, 56, 97, 106-108, and 110 have each been amended to recite that the device is an electrical device comprising at least four semiconductors assembled together as a component of the electrical device, where the at least four semiconductors are made by a process of selecting a population of catalyst colloid particles having a variation in diameter of less than 20% and growing the population of semiconductors catalytically from the catalyst colloid particles. These claims have also been amended to delete "free-standing" and "bulk-doped." Support for these amendments can be found in a specification, and as one example, on page 42, line 23-page 43, line 2. Claims 73 and 117 have been cancelled without prejudice. No new matter has been added.

Claims 1-47, 49-72, 75, 76, 97-111, 113-116, 118-201, 261, 262, and 334-500 are now pending in the application. Claims 3, 4, 9-31, 49-55, 102-105, 109, 111, 113-116, 121-174, 176-180, 182, 184, 185, 190, 192, 193, 196-201, 261, and 262 remain withdrawn.

Claim Objections

The Patent Office has rejected claims 1 and 73 for reciting the term "being free-standing" and states that "in a device, none of the elements therein can be free-standing, although some of them may be free-standing during the process of making nanowires." While Applicants do not concede the merits of the Patent Office's assertions, to advance prosecution, Applicants have deleted claim 73 and the term "free-standing" in claim 1, thereby rendering the objection moot.

Claims 43-47 and 58-61 have been objected to, as "the original disclosure lacks an adequate description regarding what length/diameter ratios should be in a device having four such nanowires. The specification, at least at page 43, lines 12-16, describes sufficient uniformity in diameter among a plurality of nanowires sufficient to provide adequate support for this language. To the extent of this objection is directed to the specification, it is believed that the objection is improper. To the extend that the objection is directed to clarity of the claims, Applicants believe that such claims are clear to one of ordinary skill in the art, and recite dimensions for at least one of the nanowires within the device, without necessarily reciting dimensions for each nanowire contained within the device. Accordingly, it is believed that the objection of claims 43-47 and 58-61 is improper, and it is respectfully requested that the objection be withdrawn.

Claim 183 has been objected as failing to clarify the relationship between at least one semiconductor and the four semiconductors defined in claim 110. Applicants believe the claim to be clear as shown, i.e., the device includes at least one semiconductor that is coupled to an electrical contact. The at least one semiconductor may be, for example, one of the four doped semiconductors recited in independent claim 110, or another semiconductor that is in addition to the at least four doped semiconductors. Thus, Applicants respectfully request that the objection of claim 183 be withdrawn.

Claims 2, 5-8, and 32-42 have also been objected to, but no reasons for these objections have been given. Withdrawn or clarification of the objection of these claims is respectfully requested.

Rejections under 35 U.S.C. §112, ¶1

Claims 99-101 and 106-108 have been rejected under 35 U.S.C. §112, ¶1, as failing to comply with the written description requirement.

Applicants believe that those of ordinary skill in the art would understand that the devices recited in claims 99-101 and 106-108 may include four doped semiconductors, each of which possess the characteristics recited in each of the claims. It is believed that those of ordinary skill in the art would understand the meaning of the terms "coherent transport," "no scattering," "ballistic transport," and "Luttinger liquid behavior," as applied to electron transport behavior at the quantum level. Accordingly, it is respectfully requested that the rejection of claims 99-101 and 106-108 under 35 U.S.C. §112, ¶1 be withdrawn.

Rejections under 35 U.S.C. §103(a) in View of Chung and Miyazaki

Claims 1, 2, 7, 32-47, 56-59, 70-73, 75, 76, 97-101, 106-108, 110, 117-120, 175, 181, 183, 186-189, 194, and 195 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Chung, et al. "Silicon Nanowire Devices," *Applied Physics Letters*, Vol. 76, No. 15, pgs. 2068-2070 ("Chung") in view of Miyazaki, U.S. Patent No. 5,537,075 ("Miyazaki").

The Patent Office has not pointed to a disclosure or a suggestion in either Chung or Miyazaki of at least four semiconductors that comprise at least one portion having a smallest width of less than 500 nanometers, where the semiconductors have a variation in diameter of less than 20%. Even in view of the Patent Office's position with respect to the "free-standing" limitation, the accuracy of which the Applicants do not concede, it is believed that none of the references relied on by the Patent Office can show such a variation in diameter of less than 20%. In particular, the method in Chung necessarily produces a larger *range* of diameters. See, for example, on page 2068, column 1, second paragraph, where Chung discloses that nanowires are produced having a *range* in diameters of between 14 and 35 nanometers.

Miyazaki cannot be relied on to cure the deficiencies of Chung. Miyazaki discloses various integrated circuits, but nowhere discloses or suggests that semiconductor nanowires can be used to produce integrated circuits, let alone devices having semiconductor nanowires having a variation in diameter of less than 20%. Thus, Miyazaki does not cure the deficiencies of Chung.

Thus, even if Chung and Miyazaki could be combined in the manner suggested in the Office Action (which Applicants do not concede), the combination of Chung and Miyazaki would not reach the instant claims, and it is therefore respectfully requested that the rejection of claims 1, 2, 7, 32-47, 56-59, 70-72, 75, 76, 97-101, 106-108, 110, 118-120, 175, 181, 183, 186-189, 194, and 195 for at least these reasons. Claims 73 and 117 have been canceled, rendering the rejection of these claims moot.

Rejections under 35 U.S.C. §103(a) in View of Morales, Heath, Tans, and Miyazaki

Claims 1, 2, 5-8, 32-47, 56-73, 75, 76, 97-101, 106-108, 110, 117-120, 175, 181, 183, 186-189, 194, and 195 have been rejected as being unpatentable over Morales, et al. "A Laser Ablation Method for the Synthesis of Crystalline Semiconductor Nanowires," Science, Vol. 279, pgs. 208-211, 1998 ("Morales") in view of Heath et al., U.S. Patent Application Publication No. US 2001/0054709 A1 ("Heath"), Tans et al. "Room-Temperature Transistor Based on a Single Carbon Nanotube," Nature, Vol. 393, pgs. 49-51 ("Tans"), and/or Miyazaki.

It is not seen where in Morales is a device comprising at least four semiconductors having a variation in diameter of less than 20% disclosed or suggested, nor is it seen where Morales discloses a process of selecting a population of catalyst colloid particles having a variation in diameter of less than 20% and growing the population of semiconductors catalytically from the catalyst colloid particles. In particular, the methods disclosed in Morales necessarily produces a larger *range* of diameters. See, for example, page 209, left column, second paragraph, where Morales discloses that nanowires are produced having a *range* in diameters that vary between 6 and 20 nanometers.

Heath, Tans, or Miyazaki cannot be relied on to cure the deficiencies of Morales. Heath nowhere discloses or suggests that the methods of Heath will result in semiconductors having a variation in diameter of less than 20%. Heath also nowhere discloses or suggests a process of selecting a population of catalyst colloid particles having a variation in diameter of less than 20% and growing the population of semiconductors catalytically from the catalyst colloid particles. Similarly, Tans discloses a transistor based on a single carbon nanotube, but nowhere discloses or suggests devices comprising multiple nanowires, let alone semiconductors having a variation in diameter of less than 20%. Miyazaki discloses various integrated circuits, but nowhere discloses or suggests that semiconductor nanowires can be used to produce integrated circuits, let

alone devices having semiconductor nanowires having a variation in diameter of less than 20%. Thus, Heath, Tans, or Miyazaki, alone or in combination, cannot cure the deficiencies of Morales to reach claimed invention.

Thus, even if Morales, Heath, Tans, or Miyazaki could be combined in the manner suggested in the Office Action (which Applicants do not concede), the combination of these references would not reach the instant claims, and it is therefore respectfully requested that the rejection of claims 1, 2, 5-8, 32-47, 56-72, 75, 76, 97-101, 106-108, 110, 118-120, 175, 181, 183, 186-189, 194 and 195 for at least these reasons. Claims 73 and 117 have been canceled, rendering the rejection of these claims moot.

CONCLUSION

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicants' representatives at the telephone number listed below.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicants hereby request any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

Respectfully submitted,

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